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ABSTRACT

A study investigated the development of spelling in 17 children over a 2-year period. All participants were drawn from a larger cohort which was part of an ongoing research project (Project RIME: Preparation in Reading Instructional Methods of Efficacy) funded by the Department of Health, Education, and Welfare. All children were administered 25 spelling words taken from the Developmental Spelling Analysis at the beginning (pre) and at the end (post) of the school year. In the current study, the 17 children were tested in both first and second grades. On the basis of scores obtained on the Spelling Rating Scale during the pretest, participants were divided into good, average, and poor spellers. The smaller cohort of 17 children was divided into these groups at the beginning of first grade and, again, at the beginning of second grade. The spelling patterns of all participants were analyzed using the expanded analyses (Letter Name and Within Word forms). An average error word score was calculated for each participant; additionally, total scores for error patterns which appeared to be orthographic and phonemic were computed. Results indicate that the pattern of errors for the three groups in the first grade evidenced more phonemic errors than orthographic errors. In the second grade this pattern changed for the average and good spellers, but the poor spellers continued to display more phonemic errors than orthographic errors. Data in the current study support the findings of the previous study in the project. (NKA)

Spelling Response Patterns and Development in Children in Grades 1 and 2.

By Judith M. Kroese, Ann M. Richards, Deborah Rhein and Janice R. Sammons

Paper presented at the International Dyslexia Association Conference
(Washington, DC, November 2000)

Spelling Response Patterns and Development in Children in Grades 1 and 2

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Spelling patterns and response types in the spelling of kindergarteners were analyzed by Lombardino, Bedford, Fortier, Carter, and Brandi (1997). Their analysis was expanded (see Letter Name and Within Word forms) and, along with the Spelling Rating Scale (SRS, Kroese, Hynd, Knight, Hiemenz, & Hall, 2000) (see Table 1) and the Developmental Spelling Analysis (DSA, Ganske, 1994), was used to analyze the development of spelling of 97 first graders and 97 second graders (Kroese, Rhein, Sammons, & Mather, 2000) over one academic year. The current study investigated the development of spelling in 17 children over a two-year period. All of these participants were drawn from a larger cohort which was part of an ongoing research project (Project RIME: Preparation in Reading Instructional Methods of Efficacy) funded by the U. S. Department of Health, Education, and Welfare.

Method

All children were administered 25 spelling words taken from the DSA at the beginning (pre) and at the end (post) of the school year. The Letter Name form was administered to first graders and the Within Word form was administered to second graders. In the current study, the 17 children were tested in both first and second grades. On the basis of scores obtained on the Spelling Rating Scale during the pretest, participants were divided into good, average, and poor spellers. The smaller cohort of 17 children was divided into these groups at the beginning of first grade and, again, divided

at the beginning of second grade. The spelling patterns of all participants were analyzed using the expanded analyses (Letter Name and Within Word forms). An average error word score, representing the mean of the rating scale levels of the SRS on all error words, was calculated for each participant (SRS Mean Error Word Score). In addition, total scores for error patterns which appeared to be orthographic (Total Orthographic Error Score) and phonemic (Total Phonemic Error Score) were computed.

Results

Results of the initial study are listed in Tables 2 and 3 (Kroese, Rhein et al., 2000). Participants' spelling abilities improved from the beginning of the school year to the end of the year on all measures. In general, the pattern of errors for the three groups (good, average, and poor) in the first grade evidenced more phonemic errors than orthographic errors. In second grade this pattern changed for the average and good spellers: they made more orthographic than phonemic errors. The poor second grade spellers continued to display more phonemic errors than orthographic errors.

We wanted to see if this pattern of change in error type from first to second grade was evident in a group of children followed over two years. There were 17 children whose spelling had been tested over a two-year period; therefore, in the current study we looked at their pattern of change with regard to types of errors made. These children were divided into poor (N = 8), average (N = 4), and good (N = 5) spellers on the basis of their initial spelling test using the SRS. The results of the error type analysis are listed in Table 5. The test results in grade 1 at the beginning of the school year show that they made

phonemic-type errors more frequently than orthographic-type errors. By the end of the first grade year, the number of errors made had reduced considerably in the average and good spellers with no obvious difference between phonemic and orthographic errors. The poor spellers, however, continued to exhibit many error types consisting of more phonemic than orthographic errors. By the beginning of second grade, however, when given a different set of 25 words at a higher level, these poor spellers were evidencing both phonemic and orthographic errors; at the end of their second grade year, this trend had continued with more orthographic errors also obvious. The average and good spellers were producing more orthographic than phonemic errors at the outset of second grade. This pattern continued at the end of second grade in the average spellers while the good spellers were making very few errors which were evenly distributed between orthographic and phonemic error types.

To further analyze the shift to orthographic errors in the poor spellers (since it did not follow the pattern seen in the larger cohort), we examined their beginning SRS scores in second grade, comparing to the means obtained by the second graders in the first study. We found that all but two of the original poor spellers were now categorized as average spellers (see Table 6). Thus, 6 of the original 8 first grade poor spellers were now spelling within the 'average' range in comparison to the larger cohort of 97 second grade children from the first study.

Conclusions

The data in the current study support the findings of the first study, documenting a shift in error type from phonemic to orthographic errors from first to second grade in average and good spellers over a two-year period. This shift suggests that they have mastered the alphabetic code but continue to show difficulty with identification of exact vowel sounds and with the various orthographic representations of sounds. The poor spellers in the current study also displayed a shift from phonemic to orthographic errors from first to second grade similar to the average and good spellers. This is different from the results obtained for poor spellers in the prior study who did not shift from phonemic to orthographic errors. This difference in findings is possibly related to the fact that 6 out of 8 of the first grade poor spellers had become better spellers and, thus, their errors had also become more orthographic in nature. Therefore, the finding of a lack of a shift in poor second grade spellers from orthographic to phonemic errors in the first study continues to imply that these students need help at the phonemic level.

The results of this study were limited by the small number of two-year participants and by the lack of poor spellers when they reached second grade. A cautionary statement about the sometimes arbitrary nature of the orthographic/phonemic categories is also warranted. Although this distinction is frequently obvious (e.g., 'sep' for 'steep' labeled as 'phonemic' or 'skrap' for 'scrap' as orthographic), there were also many decisions that were far more arbitrary (e.g., 'sip' for 'ship' labeled as a Consonant Digraph Reduction and, therefore, 'orthographic' when it was possibly a 'phonemic' error).

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Table 1

Spelling Rating Scale* ** *

Points Description Stimulus Response

0 Random string make *tpob*

1 Phonetically related letter correct *ras*

2 Correct beginning letter or sound *ruin rom*

3 More than 1 phoneme correct with phonetically-related and/or conventional letters *advice vis*

4 Correct # of syllables/vowels (if word is more *recognize reconize* than 1 syllable) with incorrect or *correct or corrat* phonetically related vowel letters. Therefore, syllables marked only by "*l, r, m, or n*," should not be given 4 points; however, words with syllables marked by "*qu*" with no other vowel should be considered for 4 points. When "*e*" is obviously a silent letter, it is not counted as marking a syllable. One-syllable words are never given 4 points--they are given either 3 or 5 points.

5 All phonemes represented with correct or *opportunity upertonity* incorrect mix of phonetically related & *explain axplan* conventional letters. Therefore, if the *success sucsus* correct number of sounds is indicated, then the word would be given a level 5 rating.

6 All phonemes with conventional letters but *physician phisician* may not be correct conventional letters. A *reasonable resinable* single vowel in a closed syllable cannot say its name (i.e., be "long"). If the grapheme is *ever* used to represent the sound (in any context), it would be considered scorable at this level (with the exception of the short vowel in a closed syllable mentioned above).

7 Correct spelling

*Adapted from: Tangel, D. M. & Blachman, B. A. (1992). Effect of phoneme awareness instruction on kindergarten children's invented spelling. *Journal of Reading Behavior*, XXIV, 233-261.
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***Kroese, J. M., Hynd, G. W., Knight, D. F., Hiemenz, J. R., & Hall, J. (2000). Clinical appraisal of spelling ability and its relationship to phonemic awareness (blending, segmenting, clision, and reversal), phonological memory, and reading in reading disabled, ADHD, and normal children. *Reading and Writing: An Interdisciplinary Journal*, 13, 105-131.

Table 2*

Mean Scores Obtained on Various Measures by High, Middle, and Low Spellers in Grades 1-2 on a Twenty-Five Word Spelling Test at the Beginning and End of the School Year

Spelling Group	Measure	First Grade**		Second Grade***	
		Pre	Post	Pre	Post
Low	Spelling Rating Scale (SRS)	33.73	131.13	92.73	116.67
	Developmental Spelling Analysis	3.20	26.77	1.88	8.27
	SRS Mean Error Word Score	1.37	4.10	3.66	4.40
	Total Orthographic Score	4.97	5.28	15.42	14.55
	Total Phonemic Score	63.27	18.48	33.36	20.76
Middle					
	Spelling Rating Scale (SRS)	91.94	151.80	122.24	140.44
	Developmental Spelling Analysis	13.06	37.00	4.79	16.26
	SRS Mean Error Word Score	3.11	4.38	4.74	5.06
	Total Orthographic Score	7.19	2.90	18.71	13.29
	Total Phonemic Score	33.55	8.23	14.94	8.82
High					
	Spelling Rating Scale (SRS)	134.28	160.47	143.47	155.47
	Developmental Spelling Analysis	25.72	42.14	15.33	27.47
	SRS Mean Error Word Score	4.27	4.48	5.22	5.37
	Total Orthographic Score	3.94	2.97	14.43	9.80
	Total Phonemic Score	14.53	4.40	7.60	4.13

*Kroese, J.M., Rhein, D., Sammons, J. R., & Mather, N. (2000, July). Spelling analyses of response patterns and development in children in grades 1-2. Paper presented at the International Conference of the Society for the Scientific Studies of Reading, Stockholm, Sweden. **Scores obtained on the Letter Name test of the Developmental Sentence Analysis (DSA). ***Scores obtained on the Within Word test of the DSA. Spelling Rating Scale and SRS Mean Error Word Score obtained from a rating scale developed by Tangel and Blachman (1992) and expanded by Kroese, Hynd, Knight, Hiemenz, and Hall (2000). The Developmental Spelling Analysis is a measure developed by Gansky (1994). The Total Orthographic Score and the Total Phonemic Score were developed for this study and are total scores of all different error types in each category (i.e., orthographic and phonemic).

Table 3***

Five Most Frequent Error Patterns on 25 Spelling Words Given at Beginning and End of School Year to 194 Children in Grades 1 and 2****

	Spelling Group		Orthographic	Phonemic
Grade 1	Low	Pre		Omission Final Consonant – 100% Omission Initial Consonant – 93% Omission Medial Consonant – 80% Consonant Sound Substitution – 77% Consonant Cluster Reduction – 53%
		Post	Letter Reversal or Inversion – 43%	Vowel Sound Substitution – 87% Consonant Sound Substitution – 40% Consonant Cluster Reduction – 36% Omission of Nasal Sound – 33%
	Middle	Pre	Consonant Digraph Reduction – 64%	Vowel Sound Substitution – 90%* Consonant Cluster Reduction – 77% Omission Medial Vowel – 74% Consonant Sound Substitution – 59%
		Post	Additional Vowel Letter – 19%	Vowel Sound Substitution – 61% Omission of Nasal Sound – 29% Consonant Cluster Reduction – 16% Consonant Sound Substitution – 13%
	High	Pre	Consonant Digraph Reduction – 39%	Consonant Sound Substitution – 88% Vowel Sound Substitution – 86% Omission of Nasal Sound – 53% Consonant Cluster Reduction – 36%
		Post	Additional Vowel Letter – 31% Letter Reversal or Inversion – 11%	Vowel Sound Substitution – 50% Omission of Nasal Sound – 11% Consonant Cluster Reduction – 11%
Grade 2	Low	Pre	Vowel Letter Substitution – 84% Consonant Letter Substitution – 76%	Vowel Sound Substitution – 100%** Consonant Sound Substitution – 97% Consonant Cluster Reduction – 88%*
		Post	Consonant Digraph Reduction – 82% Vowel Letter Substitution – 73% Vowel Digraph Reduction – 73%	Vowel Sound Substitution – 91% Consonant Sound Substitution – 73%
	Middle	Pre	Vowel Letter Substitution – 91% Consonant Digraph Reduction – 85% Consonant Letter Substitution – 68% Vowel Digraph Reduction – 68% Omission Final Vowel Letter – 68%	Vowel Sound Substitution – 100%
		Post	Vowel Digraph Reduction – 76% Vowel Letter Substitution – 73% Consonant Digraph Reduction – 56% Omission Final Vowel Letter – 47%	Vowel Sound Substitution – 85%
	High	Pre	Vowel Letter Substitution – 97% Consonant Digraph Reduction – 63% Vowel Digraph Reduction – 50%	Vowel Sound Substitution – 93% Consonant Sound Substitution – 57%
		Post	Vowel Letter Substitution – 77% Consonant Digraph Reduction – 53% Vowel Digraph Reduction – 43% Omission Final Vowel Letter – 37%	Vowel Sound Substitution – 57%

*3 or more errors **6 or more errors ***Key to error patterns in Table 4

****Kroese, J.M., Rhein, D., Sammons, J. R., & Mather, N. (2000, July). Spelling analyses of response patterns and development in children in grades 1-2. Paper presented at the International Conference of the Society for the Scientific Studies of Reading, Stockholm, Sweden

Table 4

Key for Error Response Types

Type	Examples
ORTHOGRAPHIC	
Additional Vowel Letter	"e" in "girle"
Additional Consonant Letter	"c" in "smocke"
Consonant Digraph Reduction	"c" for "ck" in "flock"
Consonant Letter Substitution	"k" for "c" in "cap"
Letter Reversal or Inversion	"d" for "b" in "bet"
Letter Order	"stepe" for "steep"
Omission Final Vowel Letter	"e" in "grape"
Vowel Digraph Reduction	"e" for "ea" in "least"
Vowel Letter Substitution	"ow" for "ou" in "couch"
PHONEMIC	
Additional Consonant Sound	"n" in "fed" ("fend")
Additional Vowel Sound	"er" in "scrap" ("skerap")
Consonant Cluster Reduction	"p" for "pl" in "plan"
Consonant Sound Substitution	"s" for "th" in "with"
Omission Final Consonant	"th" in "with"
Omission Initial Consonant	"h" in "hurt"
Omission Medial Consonant	"s" in "least"
Omission Medial Vowel	"i" in "with"
Omission of Nasal Sound	"n" in "paint"
Vowel Sound Substitution	"i" for "e" in "went"

Table 5

Five Most Frequent Error Patterns on 25 Spelling Words Given at Beginning and End of School Year to 17 Children Over a Two-Year Period* **

	Spelling Group		Orthographic	Phonemic
Grade 1	Low N = 8	Pre		Omission Medial Vowel – 100% Omission Final Consonant – 88% Omission Medial Consonant – 75% Omission Initial Consonant – 63% Consonant Sound Substitution – 63%
		Post	Reversal/Inversion – 38% Consonant Digraph Reduction – 38%	Vowel Sound Substitution – 88% Consonant Sound Substitution – 75% Omission of Nasal Sound– 63% Consonant Cluster Reduction - 50% Omission Medial Vowel – 38% Additional Consonant Sound – 38%
	Middle N = 4	Pre	Consonant Digraph Reduction – 75%	Vowel Sound Substitution – 100% Omission Medial Vowel – 75% Omission Final Vowel – 75% Omission of Nasal Sound– 75%
		Post	Consonant Digraph Reduction – 75%	Vowel Sound Substitution – 75% Omission of Nasal Sound– 50%
	High N = 5	Pre	Consonant Digraph Reduction – 20%	Vowel Sound Substitution – 80% Consonant Sound Substitution – 60% Omission of Nasal Sound– 60% Consonant Cluster Reduction – 20% Consonant Cluster Substitution – 20%
		Post	Additional Vowel Letter – 20% Letter Reversal/Inversion – 20%	Additional Vowel Sound – 20% Omission of Nasal Sound– 20%
Grade 2	Low N = 8	Pre	Vowel Digraph Reduction – 75% Omission Final Vowel Letter – 75% Vowel Letter Substitution – 63%	Vowel Sound Substitution – 100% Consonant Sound Substitution – 88% Consonant Cluster Reduction – 63%
		Post	Vowel Letter Substitution – 88% Vowel Digraph Reduction – 75% Consonant Digraph Reduction – 50% Consonant Letter Substitution – 50% Omission Final Vowel Letter – 50%	Vowel Sound Substitution – 100%
	Middle N = 4	Pre	Vowel Letter Substitution – 100% Consonant Letter Substitution – 75% Consonant Digraph Reduction – 50% Vowel Digraph Reduction – 50% Omission Final Vowel Letter – 50%	Vowel Sound Substitution – 100% Omission of Nasal Sound– 50%
		Post	Vowel Letter Substitution - 75% Consonant Letter Substitution – 50% Consonant Digraph Reduction – 25% Vowel Digraph Reduction – 25% Additional Consonant Letter – 25% Letter Order – 25% Omission Final Vowel Letter – 25%	Vowel Sound Substitution – 75%
	High N = 5	Pre	Vowel Letter Substitution – 100% Consonant Digraph Reduction – 60% Vowel Digraph Reduction – 60% Additional Vowel Letter – 60% Omission Final Vowel Letter – 60%	Vowel Sound Substitution – 40%
		Post	Vowel Letter Substitution – 60% Consonant Letter Substitution – 40% Letter Order – 40%	Vowel Sound Substitution – 40% Additional Vowel Sound – 40%

*Key to error patterns in Table 4. **Percentages reflect the proportion of students making two or more errors of that type.

Table 6

Classification of 17 Participants into Poor, Average, and Good Spellers on the Basis of their SRS Scores at the Beginning of First Grade and, again, at the Beginning of Second Grade

	Grade 1	Grade 2
Poor	8	2
Average	4	9
Good	5	6
Total	17	17

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